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The objective of the CAMP program is to demonstrate the feasibility of reusable Ada software parts in a real-time embedded application area; the domain chosen for the demonstration was that of missile flight software systems. This required that the existence of commonality within that domain be verified (in order to justify the development of parts for that domain), and that software parts be designed which address those areas identified. An associated parts system was developed to support parts usage. Volume 1 of this document is the User's Guide to the CAMP Software parts; Volume 2 is the Version Description Document; Volume 3 is the Software Product Specification; Volumes 4-6 contain the Top-Level Design Document; and, Volumes 7-12 contain the Detail Design Documents.

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AFATL-TR-88-18, Vol 2

VERSION DESCRIPTION DOCUMENT

FOR THE

MISSILE SOFTWARE PARTS

OF THE

COMMON ADA MISSILE PACKAGES (CAMP)

PROJECT

CONTRACT F08635-86-C-0025

AIR FORCE ARMAMENT LABORATORY

Air Force Systems Command ▮ United States Air Force ▮ Eglin Air Force Base, Flori

VERSION DESCRIPTION DOCUMENT

FOR THE

MISSILE SOFTWARE PARTS

OF THE

COMMON ADA MISSILE PACKAGES (CAMP)

PROJECT

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30 October 1987

Prepared for:

Air Force Armament Laboratory
Aeromechanics Division
Guidance & Control Branch
Eglin AFB, Florida 32542

Prepared by:

McDonnell Douglas Astronautics Company
Post Office Box 516
St. Louis, Missouri 63166

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1. SCOPE

1.1 Identification

This Version Description Document describes Version 1.0 for the CSCI identified as the Common Ada Missile Packages (CAMP).

The CAMP-1 program was a twelve-month feasibility study which the McDonnell Douglas Astronautics Company performed under contract to the U.S. Air Force Armament Laboratory (AFATL). This project had two primary objectives:

1. To determine the feasibility of developing reusable missile software components written in Ada; and,
2. To determine the feasibility of developing an automated or semi-automated missile software generation system.

The CAMP-2 program was a twenty-four-month study which the McDonnell Douglas performed under contract to the U.S. Air Force Armament Laboratory (AFATL). The primary objectives of this project were:

1. Implement those parts receiving top-level design under the CAMP-1 program. This included detailed design, code, unit, and integration testing.
2. Show that reusable software parts can result in significant productivity and quality improvements.
3. Implement an 11th Missile Application using CAMP parts.

1.2 Purpose

The Missile Software Parts constitute a set of common software identified under the domain analysis of the CAMP study. These software parts are grouped into Top-Level Computer Software Components (TLCSCs) and are divided into the categories shown in the following table.

Category	TLCSC Name	Description
Data Constants	WGS72_Ellipsoid_Engineering_Data WGS72_Ellipsoid_Metric_Data WGS72_Ellipsoid_Unitless_Data Universal_Constants Conversion_Factors	TLCSCs which provide data constants used in a typical application
Data Types	Basic_Data_Types Kalman_Filter_Data_Types Autopilot_Data_Types	TLCSCs which provide data types used in other TLCSCs or in a user application
Equipment Interfaces	Missile_Radar_Altimeter Missile_Radar_Altimeter_with_Autopower_On Clock_Handler	TLCSCs which provide standard interfaces to specific hardware components or to general classes of hardware
Navigation	Common_Navigation_Parts Wander_Azimuth_Navigation_Parts North_Pointing_Navigation_Parts Direction_Cosine_Matrix_Operations	TLCSCs which provide the basic functionality of a navigation subsystem
Kalman Filter	Kalman_Filter_Common_Parts TLCSC Kalman_Filter_Compact_H_Parts TLCSC Kalman_Filter_Complicated_H_Parts TLCSC	TLCSCs which provide common Kalman Filter functions

Category	TLCSC Name	Description
Guidance and Control	Waypoint_Steering Autopilot	TLCSCs which provide the basic functionality of a guidance and control subsystem
Nonguidance Control	Air_Data_Parts TLCSC Fuel_Control_Parts TLCSC	TLCSCs which provide the basic functionality of a control subsystem for operations outside of the guidance area
Mathematical	Coordinate_Vector_Matrix_Algebra General_Vector_Matrix_Algebra Standard_Trig Geometric_Operations Signal_Processing Polynomials General_Purpose_Math Unit_Conversions External_Form_Conversion_Twos_Complement Quaternion_Operations	TLCSCs which provide a variety of useful mathematical functions such as coordinate and matrix algebra, trigonometric, and signal processing functions
Abstract Mechanisms	Abstract_Data_Structures	TLCSCs which provide abstract data structures and processes
General Utilities	General_Utilities Communication_Parts	TLCSCs which provide other functions needed for missile or other weapons system operation

1.3 Introduction

This Version Description Document provides details on the Version 1.0 release of the CAMP missile software parts. This document contains information on:

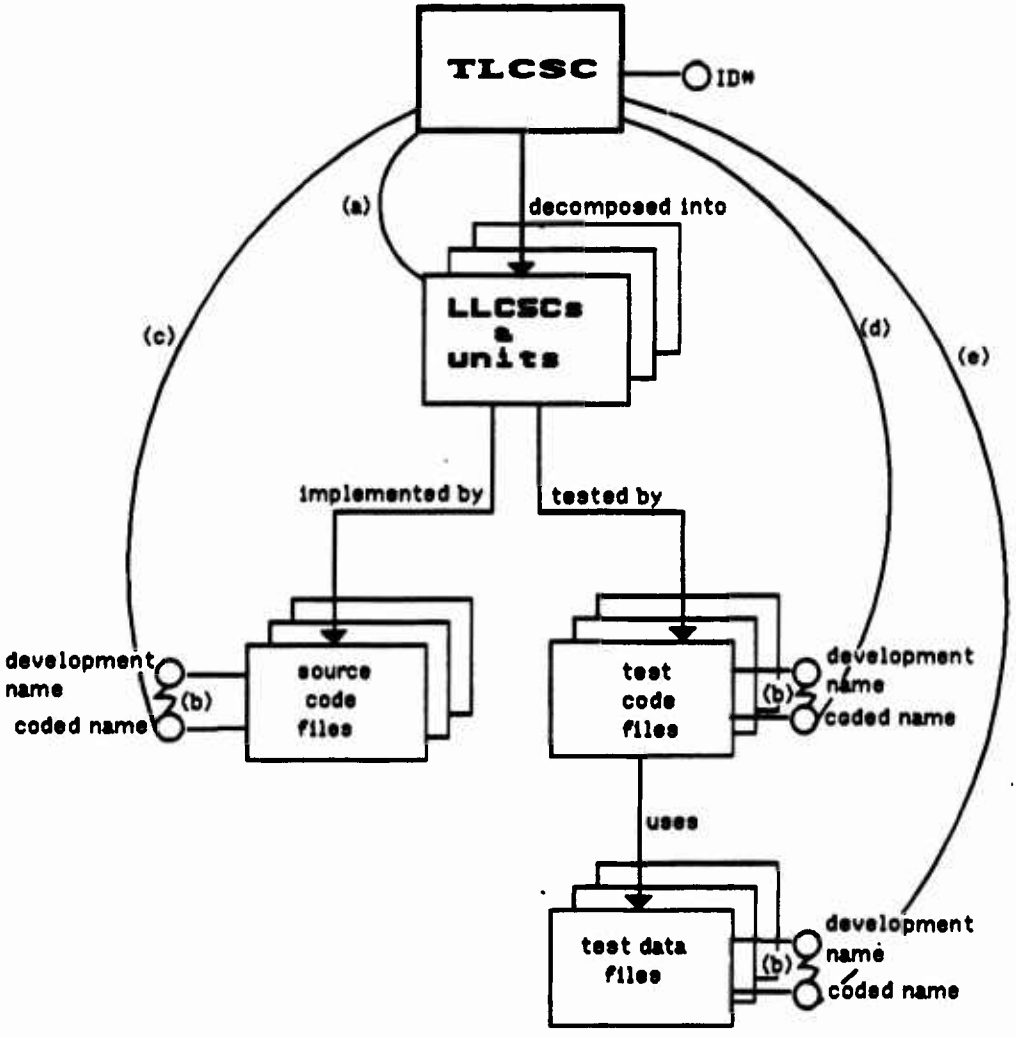
* what items constitute a complete release (see Section 3.1),
* how the CAMP parts may have to be adapted for compilation on compilers other than the VAX Ada compiler (see Sections 3.5 and 3.10), and
* how to install the CAMP parts (see Section 3.9).

In addition, appendices are included which contain the following:

* Tape inventory (Appendix I) -- an inventory of the tapes included in this release
* Part number cross reference (Appendix II) -- a listing of all CAMP TLCSCs by part number and grouped according to functional category
* File name cross reference (Appendix III) -- a cross-reference of coded file names used for creation of the release tapes and files names used during development of the CAMP parts
* Non-updated test code (Appendix IV) -- a listing of non-updated test code (see Section 3.10)
* Catalog microfiche index (Appendix V) -- a listing showing which pages are of the CAMP Parts Catalog are located on which sheets of microfiche

There are several terms which apply to the CAMP parts and the collection of files which comprise them. These terms and their relationship are shown in Figure 1-1. The CAMP parts are packaged in 35 TLCSCs. Each of TLCSCs is decomposed into LLCSCs and units. Each CSC is implemented in one or more source code files. For each CSC, there is one or more source code file which contains test code for the CSC. The test code for each CSC may use one or more data files which con-

tain test input and expected output. Each file has two attributes -- its coded name and its development name. The development name is the file name used during the CAMP project. The coded name is a shortened version of the development name used for creation of the CAMP parts distribution tape. (For further information on file names see Section I.)



(a) - Decomposition shown in Sections 3.x of the User's Guide
(b) - Relationship between development file names and coded files names is shown in Appendix III of the Version Description Document
(c) - A listing of source code files broken down by TLCSC is shown in Section III.1 of the Version Description Document
(d) - A listing of test code files broken down by TLCSC is shown in Section III.2 of the Version Description Document
(e) - A listing of test data files broken down by TLCSC is shown in Section III.4 of the Version Description Document

Figure 1-1: CAMP Parts Distribution Consists of Several Entities and Relationships

2. REFERENCED DOCUMENTS

2.1 Government Documents

The following documents of the exact issue shown form a part of the specification to the extent described herein. In the event of conflict between the documents referenced herein and the contents of this document, the contents of this document shall be considered a superseding requirement.

Standards

MIL-STD-1815A Reference Manual for the Ada Programming Language (17 February 1983)

Other Publications

CAMP-1 Final Technical Report, Volume 1, 2, & 3 (4 September 1985)

CAMP Missile Software Parts Requirements Specification (4 September 1985)

CAMP Missile Software Parts Software Top-Level Design Document (October, 1987)

CAMP Missile Software Parts Software Detailed Design Document (October, 1987)

CAMP Parts Catalog (October, 1987 [draft])

2.2 Non-Government Documents

The following documents of the exact issue shown form a part of the specification to the extent described herein. In the event of conflict between the documents referenced herein and the contents of this document, the contents of this document shall be considered a superseding requirement.

Other Publications

VAX Ada Language Reference Manual (February, 1985, Digital Equipment Corporation)

VAX Ada Programmer's Run-Time Reference Manual (February, 1985, Digital Equipment Corporation)

3. VERSION DESCRIPTION

3.1 Inventory of Materials Released

The following items comprise this release:

1. Tape set -- The tape set consists of two physical tapes. The tapes are labeled CAMP1 and CAMP2. Each of the tapes is 2400 feet and 1600 bpi. The recording format is ANSI standard label. These tapes contain the following items:

    * Source code files for all CAMP parts
    * Source code files for all CAMP test code
    * Source code files for all testing utilities packages used by the CAMP test code
    * CAMP Parts Top-Level Design Document
    * CAMP Parts Detailed Design Document

2. CAMP Parts Version Description Document and CAMP Parts Users Guide -- These two documents are bound into a single volume.

3. Microfiche copy of the CAMP Parts Catalog (draft) (Appendix V contains a listing of which pages of the document are contained on which sheets of microfiche.)

The source code files for each of the CAMP parts include code headers which extensively document the part. Since these headers were used to create the design documents, much of the header information is already documented in the CAMP Top-Level and Detailed Design documents. Figures 3-1 and 3-2 show what information is contained in the top-level and detailed design headers, and which of these sections are extracted for use in the design documents.

HEADER CONTENTS	EXTRACTED FOR DESIGN DOCUMENT
Name	•
Identification Number	•
Security Level	
Purpose	•
Requirements trace	•
Context	•
Utilization of external elements	
Packages	•
Subprograms and task entries	•
Exceptions	•
Data types	•
Data objects	•
Input/output	
Generic parameters	
Data types	•
Data objects	•
Subprograms	•
Formal parameters	•
Exported exceptions/types/objects	
Exceptions	•
Data types	•
Data objects	•
Exceptions raised	•
Calling sequence/timing/priority	•
Interrupt handling	•
Sample usage	•
Decomposition	•
Local entities contained in package body	•

Figure 3-1: Top-Level Design Header Information

HEADER CONTENTS	EXTRACTED FOR DESIGN DOCUMENT
Name	*
Identification Number	*
Security Level	
Purpose	*
Requirements trace	*
Context	*
Utilization of external elements	
Packages	*
Subprograms and task entries	*
Exceptions	*
Data types	*
Data objects	*
Utilization of other elements in top-level component	*
Packages	*
Subprograms and task entries	*
Exceptions	*
Data types	*
Data objects	*
Input/output	
Generic parameters	
Data types	*
Data objects	*
Subprograms	*
Formal parameters	*
Local exceptions/types/objects	
Exceptions	*
Data types	*
Data objects	*
Local entities	*
Exceptions raised	*
Calling sequence	*

Figure 3-2: Detailed Design Header Information

The following documentation on the CAMP parts is also available and can be obtained by contacting the indicated sources:

1. Technical Reports -- The CAMP-1 Final Technical Report is currently available through DTIC. The DTIC numbers for the three volumes are:

   * (Volume 1) AD-B-102 654
   * (Volume 2) AD-B-102 655
   * (Volume 2) AD-B-102 656

   The CAMP-2 Final Technical Report will be available from DTIC after March, 1988.

2. Design Documents -- The Software Top-Level and Detailed Design Documents will be available in hard-copy form in January, 1988. Copies may be obtained by contacting:

   Christine M. Anderson
   Chief, Computer Technology Section
   Air Force Armament Laboratory/FXG
   Eglin Air Force Base, Florida 32542-5434

3. Benchmarks -- The CAMP Armonics Benchmarks can be used to evaluate Ada and processor implementation in the armonics domain. The benchmarks represent typical armonics applications and include missile operational parts, as well as support parts from the mathematical domain. One series of tests allows the user to compare and select the appropriate function, such as a sine routine, for his application, trading off methods that provide greater accuracy at the expense of greater processing time. Another series of tests measures Ada compiler capabilities. These tests establish the correctness of compiler implementations as well as performance in size and speed of generated code. The Benchmarks will be available in January, 1988, through:

   Data and Analysis Center for Software
   Rome Air Development Center/ISSI
   Griffiss Air Force Base, NY 13441

4. AMPEE System - The CAMP Ada Missile Parts Engineering Expert System provides mechanisms for identifying potentially applicable software parts, obtaining specific information about those parts, and generating Ada components based on the catalogued parts. These mechanisms correspond to the three main AMPEE system functions: parts identification, parts catalog, and component construction.

   The Parts Catalog functions similarly to a card catalog for books, i.e., it is used to locate reusable software parts and obtain information about those parts. This subsystem also provides a means to maintain the catalog in an up-to-date form. The Parts Identification subsystem provides the user with access to the on-line parts catalog at a very high level. Unlike the Parts Catalog subsystem which requires the user to have some idea of the types of parts he is looking for, the Parts Identification subsystem provides the user with access to the information in the catalog based solely on his knowledge of his own application, i.e., before he knows about specific parts. The Component Construction subsystem provides the user with a means of generating tailored Ada components based on reusable parts that are in the Parts Catalog.

   The AMPEE System will be available through DACS in January, 1988.

5. User's Manual -- A CAMP Parts User's Manual is planned for CAMP-3. This manual will be an expansion of the information contained in the User's Guide. Among other things, it will in-

clude a sample instantiation of all generic parts showing how other CAMP parts can be used to aid in instantiation. An example of a sample instantiation is show in Figure 3-3.

```
with Waypoint_Steering;
with Basic_Data_Types; use Basic_Data_Types;
with Coordinate_Vector_Matrix_Algebra;
with WGS72_Ellipsoid_Engineering_Data;
with General_Purpose_Math;

   package WPS     renames Waypoint_Steering;
   package BDT     renames Basic_Data_Types;
   package CVMA    renames Coordinate_Vector_Matrix_Algebra;
   package GPMath  renames General_Purpose_Math;
   package WGS72   renames WGS72_Ellipsoid_Engineering_Data;

   type Indices is (X, Y, Z);

   package SCR_Sqrt is new GPMath.Square_Root
            (Inputs  => BDT.Trig.Sin_Cos_Ratio,
             Outputs => BDT.Trig.Sin_Cos_Ratio,
             Real    => BDT.Trig.Tan_Ratio);
   use SCR_Sqrt;

   package Unit_Vector_Opns is new CVMA.Vector_Operations
           (Axes              => Indices,
            Elements          => BDT.Trig.Sin_Cos_Ratio,
            Elements_Squared  => BDT.Trig.Sin_Cos_Ratio,
            Sqrt              => SCR_Sqrt.Sqrt);
   use Unit_Vector_Opns;
   subtype Unit_Vectors is Unit_Vector_Opns.Vectors;

   function Cross_Prod is new CVMA.Cross_Product
            (Axes             => Indices,
             Left_Elements    => BDT.Trig.Sin_Cos_Ratio,
             Right_Elements   => BDT.Trig.Sin_Cos_Ratio,
             Result_Elements  => BDT.Trig.Sin_Cos_Ratio,
             Left_Vectors     => Unit_Vectors,
             Right_Vectors    => Unit_Vectors,
             Result_Vectors   => Unit_Vectors);

   package Unit_Vector_Scalar_Opns is new
           CVMA.Vector_Scalar_Operations
              (Axes         => Indices,
               Elements1    => BDT.Trig.Sin_Cos_Ratio,
               Elements2    => BDT.Trig.Sin_Cos_Ratio,
               Scalars      => BDT.Trig.Sin_Cos_Ratio,
               Vectors1     => Unit_Vectors,
               Vectors2     => Unit_Vectors);

   package Steering_Vector_Opns is new
           WPS.Steering_Vector_Operations
              (Indices           => Indices,
               Earth_Distances   => BDT.Meters,
               Earth_Positions   => Earth_Position_Radians,
               Segment_Distances => BDT.Meters,
               Sin_Cos_Ratio     => BDT.Trig.Sin_Cos_Ratio,
               Unit_Vectors      => Unit_Vectors,
               Earth_Radius      => WGS72.Semimajor_Axis,
               "*"               => BDT."*",
               "/"               => Unit_Vector_Scalar_Opns."/",
               Cross_Product     => Cross_Prod,
               Vector_Length     => Unit_Vector_Opns.Vector_Length,
               Sin_Cos           => BDT.Trig.Sin_Cos);
```

Figure 3-3: Sample Instantiation of a CAMP Generic

3.2 Inventory of CSCI Contents

The computer software contained in this release consists of the source code files which comprise the CAMP parts and associated unit tests.

3.3 Class I Changes Installed

Not applicable.

3.4 Class II Changes Installed

Not applicable.

3.5 Adaptation Data

When designing the CAMP parts, great care was taken to limit and preferably avoid system dependencies and optional features of Ada. These section describes the one system dependency and optional feature used by the CAMP parts.

3.5.1 System Dependencies

The CAMP parts were developed on the VAX Ada environment provided by the Digital Equipment Corporation. The VAX Ada Compilation System (ACS) includes a Math_Lib package which provides a set of transcendental functions. The only CAMP part which is dependent on this system package is the Polynomials.System_Functions LLCSC. This system dependency was built into the CAMP parts for the following reasons:

1. Transcendental functions are required as generic parameters by many of the CAMP parts. While these functions are now available through other LLCSCs in the Polynomials TLCSCs, they were not available during the first part of CAMP-2 since a great deal of requirements analysis was required to determine which algorithms should be implemented. If the routines in the Math_Lib package had not been used, testing would have been delayed. These delays would not have been acceptable since CAMP was a firm, fixed price contract.

2. Since an interface to the Math_Lib package had to be developed in order to start early testing of the CAMP parts, it was included in the Polynomials package since we felt other users of the CAMP parts may also wish to have an interface to the VAX standard math package. It would also benefit users of non-VAX compilers, since the package body of the Polynomials.System_Functions package could be modified to interface with their own standard math package (or with other LLCSCs in the Polynomials TLCSC) without affecting the other CAMP parts.

3. The Polynomials.System_Functions package was designed to provide a default set of mathematical functions that could be used during preliminary development or prototyping. It was not anticipated that it would be used for an embedded application.

If the CAMP parts are compiled on a system other than ACS, the System_Functions package will either have to be modified in one of the following ways:

1. The package body can be modified to interface with a local math library.

2. The package body can be modified to interface with other LLCSCs in the Polynomials TLCSC.

3. It can be eliminated. If this course of action is chosen, the Standard_Trig and General_Purpose_Math TLCSCs would have to be modified since they instantiate portions of the Systems_Functions package.

3.5.2 Optional Features

Only one optional feature of the Ada language was used when developing the CAMP parts -- separate compilation of generics. This feature was employed for the following reasons:

1. We felt the increased modularity of source code files facilitated by this option was better programming practice than having all the source code for a package in a single file.

2. Compilation time was significantly decreased since a modification of a unit did not mandate recompilation of an entire TLCSC.

3. Simplified development and improved maintainability -- smaller files are easier to develop, modify, and maintain. If all the source code for a TLCSC was maintained in a single file, the size of the file could become unmanageable. For example, if all the source code for the General_Vector_Matrix_Algebra TLCSC was placed in a single file, that file would have 32,174 lines. Placing the package specification and body in their own files would help, but even then the source code file for the package body would have 24,368 lines.

4. We felt the separate compilation of generics was a feature that was becoming standard on good Ada compilers. It was implemented in the Ada compilation system provided on the VAX, and it either was implemented or was going to be implemented by all compiler vendors contacted by us.

5. Any unnecessary increase in implementation time was unacceptable in this firm, fixed price contract.

If this feature is not implemented on your system, the separate files will need to be combined. The steps required to combine the parts are listed below and illustrated in Figure 3-4.

* Move any *with* and initial *use* statements in the separate part to the beginning of the parent part. (Any *use* statements within the separate part do not have to be moved.)
* Delete the *separate* statement from the separate part.
* Delete the *is separate* statement from the parent part and replace it with the source code for the separate part.

Using separate compilation:

```
package body General_Purpose_Math is

   package body Square_Root
                  is separate;

end General_Purpose_Math;
```

```
with Polynomials;
separate (General_Purpose_Math)
package body Square_Root is

   package System is new
               Polynomials.System_Functions.
               Square_Root (Inputs  => Real,
                            Outputs => Real);

   function Sqrt (Input : Inputs)
                  return Outputs is
      Answer : Outputs;
   begin
      Answer := Outputs(
                  System.Sqrt(Real(Input))
                  );
      return Answer;
   exception
      when others => Raise Negative_Input;
   end Sqrt;

end Square_Root;
```

After separate compilation is eliminated:

```
with Polynomials;
package body General_Purpose_Math is

   package body Square_Root is
      package System is new
                  Polynomials.System_Functions.
                  Square_Root (Inputs  => Real,
                               Outputs => Real);
      function Sqrt (Input : Inputs) return Outputs is
         Answer : Outputs;
      begin
         Answer := Outputs(System.Sqrt(Real(Input)));
         return Answer;
      exception
         when others => Raise Negative_Input;
      end Sqrt;
   end Square_Root;

end General_Purpose_Math;
```

Figure 3-4: Recombining Separate Parts

3.6 Interface Compatibility

Not applicable.

3.7 Bibliography of Reference Documents

The following documents are applicable to this release of the CSCI:

3.7.1 Government Documents

CAMP Final Technical Report, Volume 1, 2, & 3 (4 September 1985)

CAMP Missile Software Parts Requirements Specification (4 September 1985)

CAMP Missile Software Parts Software Top-Level Design Document (October, 1987)

CAMP Missile Software Parts Software Detailed Design Document (October, 1987)

3.7.2 Non-Government Documents

Other Publications

VAX Ada Language Reference Manual (February, 1985, Digital Equipment Corporation)

3.8 Operational Description

Not applicable.

3.9 Installation Instructions

Installing the CAMP parts requires reading the source code files off the tapes and then compiling them into an Ada library. If there is a desire to run the unit tests on the parts, the test utilities and unit test files will also need to be compiled.

Appendix I contains further information on the contents of the tape.

3.10 Possible Problems and Known Errors

There are no known problems or errors with the CAMP parts themselves. Recipients of the CAMP parts, however, may have problems in three areas -- immaturity of Ada compilers, non-updated test code, and unavailable test code.

3.10.1 Immature Compilers

During the performance of the CAMP project, MDAC-STL had many opportunities to see how compilers handled, and didn't handle, generics. Three validated compilers were used on the CAMP project and versions of the CAMP parts were submitted to three additional validated compilers. Of these six Ada compilers, only one was able to handle the parts submitted to it even though the parts are valid Ada and separate compilation of generics was used to test compilers which did not successfully implement that feature.

All CAMP parts have been successfully compiled, instantiated, and tested on the VAX Ada compiler

V1.3-25. In addition, they were successfully recompiled during preparation of this release. The only system dependencies they contain and optional features they employ are discussed in Section 3.5.

3.10.2 Non-updated Test Code

The CAMP-2 program, under which the final top-level and detailed design of the parts was done, was a two-year program. During this time, as would be expected, there were multiple changes to the parts and test utilities.

Whenever possible, integration testing was combined with unit testing. For example, the square root function provided by the General_Purpose_Math.Square_Root LLCSC was used whenever a part being tested required a square root function as a generic formal subroutine. Therefore, a modification in a TLCSC could affect not only other TLCSCs, but also test code for still other TLCSCs. This is illustrated in Figure 3-5 where it is shown that a modification to the General_Purpose_Math TLCSC could affect its test code, the source code for the Geometric_Operations TLCSC, and the test code for the Common_Navigation_Parts and Geometric_Operations TLCSCs. A modification such as this would have been handled in the following way:

* The test code for the General_Purpose_Math TLCSC would have been modified and the TLCSC retested.

* The Geometric_Operations TLCSC would have been modified and retested, necessitating modification of its test code.

* The test code for the Common_Navigation_Parts TLCSC would not have been modified since the change would not have direct impact on the TLCSC itself.

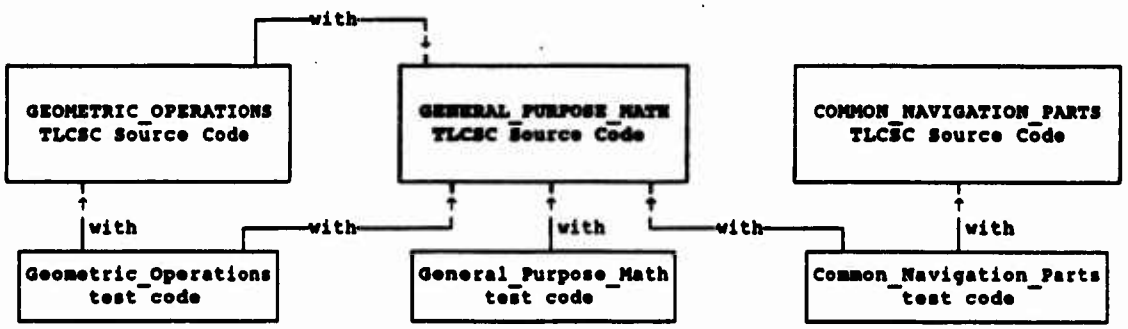


Figure 3-5: Interdependency of TLCSCs and Test Code

Regression testing was not done for several reasons:

1. It was felt the modifications did not affect the other parts. Any parts we felt were affected were retested.
2. The implementation of the 11th Missile Application served as an additional form of testing for the parts after they were modified.

Some pieces of test code will, therefore, need to be modified before they can be compiled. Section IV contains a listing of source code files containing test code which is obsolete because of changes made to CAMP parts.

3.10.3 Unavailable Test Code

There is one test code file (t001cx0.ada) for Common_Navigation_Parts.Compute_Rotation_Increments which will not compile because of missing support code. This test code *with's* a package called My_Comp_Rot_Incr. The source code file for this test package is not available at this time. It can be obtained at a later date from DACS. The inability to compile this file does not preclude testing of any other parts within the Common_Navigation_Parts TLCSC.

4. NOT USED

5. NOT USED

6. NOTES

6.1 Acronyms

ACS	Ada Compilation System
AFATL	Air Force Armament Laboratory
AMPEE	Ada Missile Parts Engineering Expert (System)
CAMP	Common Ada Missile Packages
CSCI	Computer Software Configuration Item
DACS	Data and Analysis Center for Software
DEC	Digital Equipment Corporation
LLCSC	Lower-Level Computer Software Component
MDAC-STL	McDonnell Douglas Astronautics Company - St. Louis
STARS	Software Technology for Adaptable Reliable Systems
TLCSC	Top-Level Computer Software Component

I. TAPE INVENTORY

Several types of files are contained on the tapes included with this release. These types are:

1. Software source code (multiple files)
2. Software Top-Level Design Document (one file)
3. Software Detailed Design Document (one file)
4. Software test code (multiple files)
5. Test input files (multiple files)
6. Expected test results files (multiple files)
7. Software test utilities (multiple files)
8. Installation help files

The names of all files on the tapes have been shortened from those used during the CAMP development to make them acceptable to as many systems as possible. The coded file names have a 7-character prefix and 3-character extension as shown below:

Sxxxxxx.ada	-- CAMP parts source code file
Txxxxxx.ada	-- test code file
Uxxxxxx.ada	-- test utilities file
Dxxxxxx.xxx	-- test data files (with input/output values)
ddd.txt	-- detailed design document
tldd.txt	-- top-level design document
*.com	-- installation help files

The installation help files are command procedures included on this release to aid the user in installation of the CAMP parts. They are written for execution on a VAX, but could be modified for other systems. Help files have been included to assist with the following tasks:

1. File renaming -- For those users who wish to have file names which are more meaningful than the 7-character codes assigned to each file, command procedures are included to rename all the Ada source code files from their 7-character coded names to the more meaningful names used during development of the CAMP parts. These help files are command procedures written for a VAX and would require modification for other systems. When executed, these help files will rename all the Ada source code files from their 7-character coded names to the more meaningful names used during development of the CAMP parts.

2. Compilation -- Since some of the CAMP parts are dependent upon other parts, the order of compilation is important. In some cases this dependency is between TLCSCs and in some cases it is within a TLCSC itself. Command procedures have therefore been included to compile all of the CAMP parts and test code.

I.1 Tape Contents

I.1.1 Tape1

Tape 1 contains the source code files for the CAMP parts, followed by the input/output data files for the test procedures.

The following CAMP parts source code files and associated help files are contained on Tape 1. They are listed in the order they appear on the tape. All the '.ada' files contain Ada source code. Characters 2-4 on the source code file names contain the number of the TLCSC to which the file pertains. (See Appendix II for a listing of TLCSCs by part number.) Characters 5-7 indicate whether the file

contains source code for the specification or body of the TLCSC -- '000' indicates the file contains source code for the package specification and all other files contain source code for the body of the TLCSC. There are two help files associated with the CAMP parts source code. The first one, scompil.com, contains the compilation order for all the parts. The other help file, srename.com, may be used to return the file names to the ones used during the CAMP parts development (see Appendix III for a cross reference of coded file names to development file names).

1. S001000.ADA
2. S001001.ADA
3. S001100.ADA
4. S001200.ADA
5. S001300.ADA
6. S001400.ADA
7. S001500.ADA
8. S001600.ADA
9. S001700.ADA
10. S001800.ADA
11. S002000.ADA
12. S002001.ADA
13. S002100.ADA
14. S002200.ADA
15. S002300.ADA
16. S002400.ADA
17. S002500.ADA
18. S002600.ADA
19. S002700.ADA
20. S002800.ADA
21. S002900.ADA
22. S002A00.ADA
23. S002B00.ADA
24. S002C00.ADA
25. S002D00.ADA
26. S002E00.ADA
27. S002F00.ADA
28. S002G00.ADA
29. S002H00.ADA
30. S002I00.ADA
31. S002J00.ADA
32. S002K00.ADA
33. S003000.ADA
34. S003001.ADA
35. S361000.ADA
36. S361001.ADA
37. S602000.ADA
38. S602001.ADA
39. S611000.ADA
40. S612000.ADA
41. S613000.ADA
42. S614000.ADA
43. S615000.ADA
44. S621000.ADA
45. S621001.ADA
46. S622000.ADA
47. S622001.ADA
48. S623000.ADA
49. S623001.ADA
50. S631000.ADA
51. S631001.ADA
52. S632000.ADA
53. S632001.ADA
54. S634000.ADA
55. S634001.ADA
56. S644000.ADA
57. S644001.ADA
58. S644100.ADA
59. S644110.ADA
60. S644120.ADA
61. S644121.ADA
62. S644122.ADA
63. S644130.ADA
64. S644140.ADA
65. S644150.ADA
66. S644160.ADA
67. S644170.ADA
68. S644180.ADA
69. S644200.ADA
70. S644210.ADA
71. S644220.ADA
72. S644230.ADA
73. S644240.ADA
74. S651000.ADA
75. S651001.ADA
76. S651100.ADA
77. S651200.ADA
78. S651300.ADA
79. S652000.ADA
80. S652001.ADA
81. S652100.ADA
82. S652200.ADA
83. S652300.ADA
84. S652400.ADA
85. S652500.ADA
86. S652600.ADA
87. S653000.ADA
88. S653001.ADA
89. S653100.ADA
90. S653200.ADA
91. S653300.ADA
92. S653400.ADA
93. S653500.ADA
94. S653600.ADA
95. S661000.ADA
96. S661001.ADA
97. S661300.ADA
98. S661310.ADA
99. S661320.ADA
100. S661400.ADA
101. S661500.ADA
102. S661510.ADA
103. S661520.ADA
104. S661530.ADA
105. S661600.ADA
106. S661700.ADA
107. S661800.ADA
108. S661810.ADA
109. S661820.ADA
110. S661900.ADA
111. S661A00.ADA
112. S662000.ADA
113. S662001.ADA
114. S662100.ADA
115. S662200.ADA
116. S662300.ADA
117. S671000.ADA
118. S671001.ADA
119. S671100.ADA
120. S671200.ADA
121. S671300.ADA
122. S671400.ADA
123. S671500.ADA
124. S671600.ADA
125. S672000.ADA
126. S672001.ADA
127. S681000.ADA
128. S681001.ADA
129. S681100.ADA
130. S681130.ADA
131. S681140.ADA
132. S681150.ADA
133. S681160.ADA
134. S681170.ADA
135. S681180.ADA
136. S681200.ADA
137. S681230.ADA
138. S681240.ADA
139. S681300.ADA
140. S681320.ADA
141. S681400.ADA
142. S681500.ADA
143. S681600.ADA
144. S681700.ADA
145. S682000.ADA
146. S682001.ADA
147. S682100.ADA
148. S682200.ADA
149. S682300.ADA
150. S682400.ADA
151. S682500.ADA
152. S682600.ADA
153. S682700.ADA
154. S682800.ADA
155. S682900.ADA
156. S682A00.ADA
157. S682B00.ADA
158. S682C00.ADA
159. S682D00.ADA
160. S682E00.ADA
161. S682F00.ADA
162. S682G00.ADA
163. S682H00.ADA
164. S682J00.ADA
165. S682K00.ADA
166. S682L00.ADA
167. S682M00.ADA
168. S682N00.ADA
169. S682P00.ADA
170. S682Q00.ADA
171. S682R00.ADA
172. S682S00.ADA
173. S682T00.ADA
174. S682U00.ADA
175. S682V00.ADA
176. S682W00.ADA
177. S682X00.ADA
178. S682Y00.ADA
179. S682Z00.ADA
180. S683000.ADA
181. S683001.ADA
182. S684000.ADA
183. S684001.ADA
184. S684100.ADA
185. S684200.ADA
186. S684300.ADA
187. S684400.ADA
188. S684500.ADA
189. S686000.ADA
190. S686001.ADA
191. S686100.ADA
192. S686200.ADA
193. S686300.ADA
194. S686400.ADA
195. S686500.ADA
196. S686600.ADA
197. S686700.ADA
198. S686800.ADA
199. S686900.ADA
200. S686A00.ADA
201. S686B00.ADA
202. S687000.ADA
203. S687001.ADA
204. S687100.ADA
205. S687200.ADA
206. S687300.ADA
207. S687400.ADA
208. S687500.ADA
209. S687600.ADA
210. S687700.ADA
211. S687800.ADA
212. S687900.ADA
213. S687A00.ADA
214. S687B00.ADA
215. S687C00.ADA
216. S687D00.ADA
217. S687E00.ADA
218. S687F00.ADA
219. S687G00.ADA
220. S687H00.ADA
221. S688000.ADA
222. S688001.ADA
223. S688200.ADA
224. S688210.ADA
225. S688220.ADA
226. S688230.ADA
227. S688300.ADA
228. S688310.ADA
229. S688400.ADA
230. S688410.ADA
231. S688420.ADA
232. S688500.ADA
233. S688510.ADA
234. S688520.ADA
235. S688800.ADA
236. S688900.ADA
237. S688A00.ADA
238. S688A10.ADA
239. S688A20.ADA
240. S688A40.ADA
241. S688A50.ADA
242. S688B00.ADA
243. S688C00.ADA
244. S688C10.ADA
245. S688C20.ADA
246. S688C30.ADA
247. S688C40.ADA
248. S688C50.ADA
249. S688C60.ADA
250. S688D00.ADA
251. S688D10.ADA
252. S688E00.ADA
253. S688E40.ADA
254. S688E50.ADA
255. S688F00.ADA
256. S691000.ADA
257. S691001.ADA
258. S691010.ADA
259. S691100.ADA
260. S691200.ADA
261. S691300.ADA
262. S691400.ADA
263. S691500.ADA
264. S691600.ADA
265. S851000.ADA
266. S851001.ADA
267. S852000.ADA
268. S852001.ADA
269. S890000.ADA
270. S890001.ADA
271. S890100.ADA
272. S890200.ADA
273. SCOMPIL.COM
274. SRENAME.COM

The following input/output data files required by the CAMP test code and associated help files are contained on Tape 1. They are listed in the order they appear on the tape. Characters 2-4 of the file names contain the number of the TLCSC to which the file pertains. Data files names with extensions of .bmk contain expected results for a unit test, those with extensions of .inp contain unit test input data, and those with extensions of .com contain the commands to run the file along with input/output values. The help file drename.com may be used to return the file names to the ones used during the CAMP parts development and the ones expected by the test code.

1. D001CNA.BMK
2. D001CNA.INP
3. D002WAN.BMK
4. D002WAN.INP
5. D003NPN.BMK
6. D003NPN.INP
7. D361GEN.BMK
8. D602COM.BMK
9. D621BDT.BMK
10. D622KDT.BMK
11. D622KDT.INP
12. D634CLO.COM
13. D634CLO.INP
14. D644DCM.BMK
15. D644DCM.INP
16. D651KAL.BMK
17. D651KAL.INP
18. D652KAL.BMK
19. D652KAL.INP
20. D653KAL.BMK
21. D653KAL.INP
22. D661WPS.BMK
23. D661WPS.INP
24. D662AUT.BMK
25. D662AUT.INP
26. D671AIR.BMK
27. D671AIR.INP
28. D672FUE.BMK
29. D672FUE.INP
30. D681001.BMK
31. D681002.BMK
32. D681003.BMK
33. D681004.BMK
34. D681005.BMK
35. D681006.BMK
36. D681007.BMK
37. D681008.BMK
38. D681009.BMK
39. D681010.BMK
40. D681011.BMK
41. D681012.BMK
42. D681013.BMK
43. D681014.BMK
44. D681015.BMK
45. D681016.BMK
46. D681017.BMK
47. D681018.BMK
48. D681019.BMK
49. D681020.BMK
50. D681021.BMK
51. D681022.BMK
52. D681023.BMK
53. D681024.BMK
54. D681025.BMK
55. D681026.BMK
56. D681027.BMK
57. D681028.BMK
58. D682GVM.BMK
59. D683ATA.BMK
60. D683ATA.INP
61. D683DEG.BEN
62. D683INS.BEN
63. D683RAD.BEN
64. D683SEM.BEN
65. D684GEO.BMK
66. D684GEO.INP
67. D686SIG.BMK
68. D687000.BMK
69. D688001.BEN
70. D688002.COM
71. D688003.BEN
72. D688004.COM
73. D688005.BEN
74. D688006.BEN
75. D688007.COM
76. D688008.BEN
77. D688009.COM
78. D688010.BEN
79. D688011.BEN
80. D688012.COM
81. D688013.BEN
82. D688014.COM
83. D688015.BEN
84. D688016.BEN
85. D688017.COM
86. D688018.BEN
87. D688019.COM
88. D688020.BEN
89. D688021.BEN
90. D688022.COM
91. D688023.BEN
92. D688024.COM
93. D688025.BEN
94. D688026.BEN
95. D688027.COM
96. D688028.BEN
97. D688029.COM
98. D688030.BEN
99. D688POL.BMK
100. D688POL.INP
101. D691ADS.BMK
102. D851UC.BMK
103. D852EFC.BMK
104. D852EFC.INP
105. D890QUA.BMK
106. D890QUA.INP
107. DRENAME.COM

I.1.2 Tape 2

Tape 2 contains the unit test code for the CAMP parts, the test utilities required by the test code, the CAMP Parts Top-Level Design Document, and the CAMP Parts Detailed Design Document.

The following testing utilities and associated help files are on Tape 2. They are listed in the order they appear on the tape. All the '.ada' files contain Ada source code. There are two help files associated with the CAMP parts test code. The first one, ucompil.com, contains the compilation order for all the files. The other help file, urename.com, may be used to return the file names to the ones used during the CAMP parts development.

1. UBG000.ADA
2. UDT000.ADA
3. URO000.ADA
4. URO001.ADA
5. URO100.ADA
6. URR000.ADA
7. URR001.ADA
8. URR010.ADA
9. URR020.ADA
10. URR030.ADA
11. URR040.ADA
12. URR100.ADA
13. URR200.ADA
14. URR300.ADA
15. URR400.ADA
16. URR500.ADA
17. URR600.ADA
18. URR700.ADA
19. URR800.ADA
20. URR900.ADA
21. URRA00.ADA
22. UCOMPIL.COM
23. URENAME.COM

The following CAMP parts test code and associated help files are on Tape 2. They are listed in the order they appear on the tape All the '.ada' files contain Ada source code. Characters 2-4 on the source code file names contain the number of the TLCSC being tested (See Appendix II for a listing of TLCSCs by part number.) There are two help files associated with the CAMP parts test code. The first one, tcompil.com, contains the compilation order for all the test code. The second one, trename.com, may be used to return the file names to the ones used during the CAMP parts development.

1. D001CNA.BMK
2. D001CNA.INP
3. D002WAN.BMK
4. D002WAN.INP
5. D003NPN.BMK
6. D003NPN.INP
7. D361GEN.BMK
8. D602COM.BMK
9. D621BDT.BMK
10. D622KDT.BMK
11. D622KDT.INP
12. D634CLO.BMK
13. D634CLO.INP
14. D644DCM.BMK
15. D644DCM.INP
16. D651KAL.BMK
17. D651KAL.INP
18. D652KAL.BMK
19. D652KAL.INP
20. D653KAL.BMK
21. D653KAL.INP
22. D661WPS.BMK
23. D661WPS.INP
24. D662AUT.BMK
25. D662AUT.INP
26. D671AIR.BMK
27. D671AIR.INP
28. D672FUE.BMK
29. D672FUE.INP
30. D681001.BMK
31. D681002.BMK
32. D681003.BMK
33. D681004.BMK
34. D681005.BMK
35. D681006.BMK
36. D681007.BMK
37. D681008.BMK
38. D681009.BMK
39. D681010.BMK
40. D681011.BMK
41. D681012.BMK
42. D681013.BMK
43. D681014.BMK
44. D681015.BMK
45. D681016.BMK
46. D681017.BMK
47. D681018.BMK
48. D681019.BMK
49. D681020.BMK
50. D681021.BMK
51. D681022.BMK
52. D681023.BMK
53. D681024.BMK
54. D681025.BMK
55. D681026.BMK
56. D681027.BMK
57. D681028.BMK
58. D682GVM.BMK
59. D683ATA.BMK
60. D683ATA.INP
61. D683DEG.BEN
62. D683INS.BEN
63. D683RAD.BEN
64. D683SEM.BEN
65. D684GEO.BMK
66. D684GEO.INP
67. D686SIG.BMK
68. D687000.BMK
69. D688001.BEN
70. D688002.COM
71. D688003.BEN
72. D688004.COM
73. D688005.BEN
74. D688006.BEN
75. D688007.COM
76. D688008.BEN
77. D688009.COM
78. D688010.BEN
79. D688011.BEN
80. D688012.COM
81. D688013.BEN
82. D688014.COM
83. D688015.BEN
84. D688016.BEN
85. D688017.COM
86. D688018.BEN
87. D688019.COM
88. D688020.BEN
89. D688021.BEN
90. D688022.COM
91. D688023.BEN
92. D688024.COM
93. D688025.BEN
94. D688026.BEN
95. D688027.COM
96. D688028.BEN
97. D688029.COM
98. D688030.BEN
99. D688POL.BMK
100. D688POL.INP
101. D691ADS.BMK
102. D851UC.BMK
103. D852EFC.BMK
104. D852EFC.INP
105. D890QUA.BMK
106. D890QUA.INP
107. DRENAME.COM

The final two files contained on Tape 2 contain the CAMP parts top-level and detailed design documents. Their names are listed below:

1. tldd.txt
2. ddd.txt

II. PART NUMBER CROSS REFERENCE

The following table lists the TLCSCs comprising this release, listed by part number, and grouped by functional category:

Part Number	TLCSC Name
Data constant packages:	
611	WGS72_Ellipsoid_Metric_Data
612	WGS72_Ellipsoid_Engineering_Data
613	WGS72_Ellipsoid_Unitless_Data
614	Conversion_Factors
615	Universal_Constants
Data types packages:	
621	Basic_Data_Types
622	Kalman_Filter_Data_Types
623	Autopilot_Data_Types
Equipment interface packages:	
631	Missile_Radar_Altimeter
632	Missile_Radar_Altimeter_with_Auto_Power_On
634	Clock_Handler
Navigation packages:	
001	Common_Navigation_parts
002	Wander_Azimuth_Navigation_Parts
003	North_Pointing_Navigation_Parts
644	Direction_Cosine_Matrix_Operations
Kalman filter packages:	
651	Kalman_Filter_Common_Parts
652	Kalman_Filter_Compact_H_Parts
653	Kalman_Filter_Complicated_H_Parts
Guidance and control packages:	
661	Waypoint_Steering
662	Autopilot

Part Number	TLCSC Name
Non-guidance control packages:	
671	Air_Data_Parts
672	Fuel_Control_Parts
Mathematical packages:	
681	Coordinate_Vector_Matrix_Algebra
682	General_Vector_Matrix_Algebra
683	Standard_Trig
684	Geometric_Operations
686	Signal_Processing
688	Polynomials
687	General_Purpose_Math
851	Unit_Conversions
852	External_Form_Conversion_Twos_Complement
890	Quaternion_Operations
Abstract mechanism packages:	
691	Abstract_Data_Structures
General utility packages:	
361	General_Utilities
602	Communication_Parts

III. FILE NAME CROSS REFERENCE

This appendix contains tables giving cross references between the coded file names given to all files on the distribution tapes and the files names used during development of the CAMP parts.

III.1 CAMP Parts Source Code

The following table provides a file name cross reference for all files containing source code for the CAMP data constant parts:

Coded Name	Development Name
WGS72_Ellipsoid_Metric_Data (P611)	
s611000.ada	611_000_wgs72_metric_.ada
WGS72_Ellipsoid_Engineering_Data (P612)	
s612000.ada	612_000_wgs72_engineering_.ada
WGS72_Ellipsoid_Unitless_Data (P613)	
s613000.ada	613_000_wgs72_unitless_.ada
Conversion_Factors (P614)	
s614000.ada	614_000_conversion_factors_.ada
Universal_Constants (P615)	
s615000.ada	615_000_universal_constants_.ada

The following table provides a file name cross reference for all files containing source code for the CAMP data type parts:

Coded Name	Development Name
Basic_Data_Types (P621)	
s621000.ada	621_000_bdt_.ada
s621001.ada	621_001_bdt.ada
Kalman_Filter_Data_Types (P622)	
s622000.ada	622_000_kdt_.ada
s622001.ada	622_001_kdt.ada
Autopilot_Data_Types (P623)	
s623000.ada	623_000_autopilot_data_types_.ada
s623001.ada	623_001_autopilot_data_types.ada

The following table provides a file name cross reference for all files containing source code for the CAMP equipment interface parts:

Coded Name	Development Name
Missile_Radar_Altimeter (P631)	
s631000.ada	631_000_missile_radar_altimeter_.ada
s631001.ada	631_001_missile_radar_altimeter.ada
Missile_Radar_Altimeter_with_Auto_Power_On (P632)	
s632000.ada	632_000_missile_radar_alt_autopower_.ada
s632001.ada	632_001_missile_radar_alt_autopower.ada
Clock_Handler (P634)	
s634000.ada	634_000_clock_handler_.ada
s634001.ada	634_001_clock_handler.ada

The following table provides a file name cross reference for all files containing source code for the CAMP navigation parts:

Coded Name	Development Name
Common_Navigation_Parts (P001)	
s001000.ada	001_000_common_nav_.ada
s001001.ada	001_001_common_nav.ada
s001100.ada	001_100_altitude_integration.ada
s001200.ada	001_200_comp_ground_vel.ada
s001300.ada	001_300_comp_grav_accel_lat_in.ada
s001400.ada	001_400_comp_grav_accel_sin_lat_in.ada
s001500.ada	001_500_comp_heading.ada
s001600.ada	001_600_update_velocity.ada
s001700.ada	001_700_scalar_velocity.ada
s001800.ada	001_800_comp_rotation_incr.ada
Wander_Azimuth_Navigation_Parts (P002)	
s002000.ada	002_000_wa_nav_.ada
s002001.ada	002_001_wa_nav.ada
s002100.ada	002_100_east_velocity.ada
s002200.ada	002_200_north_velocity.ada
s002300.ada	002_300_earth_rel_hor_vels.ada
s002400.ada	002_400_total_angular_vel.ada
s002500.ada	002_500_coriolis_accel.ada
s002600.ada	002_600_coriolis_accel_tot_rates.ada
s002700.ada	002_700_rad_of_curv.ada

Coded Name	Development Name
s002800.ada	002_800_tot_platform_rot_rate.ada
s002900.ada	002_900_earth_rot_rate.ada
s002a00.ada	002_a00_earth_rel_rot_rate.ada
s002b00.ada	002_b00_latitude.ada
s002c00.ada	002_c00_latitude_using_atan.ada
s002d00.ada	002_d00_longitude.ada
s002e00.ada	002_e00_wander_angle.ada
s002f00.ada	002_f00_east_vel_sin_cos.ada
s002g00.ada	002_g00_north_vel_sin_cos.ada
s002h00.ada	002_h00_earth_rel_hor_vels_sin_cos.ada
s002i00.ada	002_i00_latitude_using_atan2.ada
s002j00.ada	002_j00_longitude_using_atan2.ada
s002k00.ada	002_k00_wander_angle_using_atan2.ada
North_Pointing_Navigation_Parts (P003)	
s003000.ada	003_000_np_nav_.ada
s003001.ada	003_001_np_nav.ada
Direction_Cosine_Matrix_Operations (P644)	
s644000.ada	644_000_dcm_.ada
s644001.ada	644_001_dcm.ada
s64[illegible]00.ada	644_100_dcm_genl_opns.ada
s644110.ada	644_110_dcm_init_from_ref.ada
s644120.ada	644_120_dcm_trapezoidal_integ.ada
s644121.ada	644_121_reinit_ang_vel.ada
s644122.ada	644_122_trap_integ_of_dcm.ada
s644130.ada	644_130_perf_rectangular_integ.ada
s644140.ada	644_140_reorthornormalize_dcm.ada
s644150.ada	644_150_frame_misalignment.ada
s644160.ada	644_160_aligned_dcm.ada
s644170.ada	644_170_1st_row_from_orthonormal.ada
s644180.ada	644_180_dcm_from_quat.ada
s644200.ada	644_200_cne_opns.ada
s644210.ada	644_210_cne_init_from_earth_pos.ada
s64[illegible]220.ada	644_220_cne_integration.ada
s644230.ada	644_230_alignment_parts.ada

Coded Name	Development Name
s644240.ada	644_240_cne_from_quat.ada
Direction_Cosine_Matrix_Operations (P644)	
t644000.ada	644_000_dcm_opns_tc_.ada
t644100.ada	644_100_instantiation_test_tc.ada
t644200.ada	644_200_dcm_general_opns_tc.ada
t644300.ada	644_300_cne_opns_tc.ada
t644zzz.ada	644_zzz_dcm_opns_tdrvr_tc.ada

The following table provides a file name cross reference for all files containing source code for the CAMP Kalman filter parts:

Coded Name	Development Name
Kalman_Filter_Common_Parts (P651)	
s651000.ada	651_000_kalman_common_.ada
s651001.ada	651_001_kalman_common.ada
s651100.ada	651_100_phi_q_manager.ada
s651200.ada	651_200_p_manager.ada
s651300.ada	651_300_phi_manager.ada
Kalman_Filter_Compact_H_Parts (P652)	
s652000.ada	652_000_kalman_compact_.ada
s652001.ada	652_001_kalman_compact.ada
s652100.ada	652_100_ckg.ada
s652200.ada	652_200_update_p.ada
s652300.ada	652_300_update_x.ada
s652400.ada	652_400_update_p_and_x.ada
s652500.ada	652_500_kalman_update.ada
s652600.ada	652_600_update_p_general.ada
Kalman_Filter_Complicated_H_Parts (P653)	
s653000.ada	653_000_kalman_complicated_.ada
s653001.ada	653_001_kalman_complicated.ada
s653100.ada	653_100_ckg.ada
s653200.ada	653_200_update_p.ada
s653300.ada	653_300_update_x.ada
s653400.ada	653_400_update_p_and_x.ada
s653500.ada	653_500_kalman_update.ada

Coded Name	Development Name
s653600.ada	653_600_update_p_general.ada

The following table provides a file name cross reference for all files containing source code for the CAMP guidance and control parts:

Coded Name	Development Name
Waypoint_Steering (P661)	
s661000.ada	661_000_waypoint_steering_.ada
s661001.ada	661_001_waypoint_steering.ada
s661300.ada	661_300_steering_vector_opns.ada
s661310.ada	661_310_initialize.ada
s661320.ada	661_320_update.ada
s661400.ada	661_400_turn_angle_and_direction.ada
s661500.ada	661_500_crsstrk_and_hdg_err_opns.ada
s661510.ada	661_510_comp_when_turning.ada
s661520.ada	661_520_comp_when_not_turning.ada
s661530.ada	661_530_compute.ada
s661600.ada	661_600_dist_to_curr_waypoint.ada
s661700.ada	661_700_comp_turn_nonturn_dist.ada
s661800.ada	661_800_turn_test_opns.ada
s661810.ada	661_810_stop_test.ada
s661820.ada	661_820_start_test.ada
s661900.ada	661_900_steering_vector_opns_arcsin.ada
s661a00.ada	661_a00_dist_to_curr_waypoint_arcsin.ada
Autopilot (P662)	
s662000.ada	662_000_autopilot_.ada
s662001.ada	662_001_autopilot.ada
s662100.ada	662_100_integral.ada
s662200.ada	662_200_lateral.ada
s662300.ada	662_300_pitch.ada

The following table provides a file name cross reference for all files containing source code for the CAMP nonguidance control parts:

Coded Name	Development Name
Air_Data_Parts (P671)	
s671000.ada	671_000_air_data_.ada
s671001.ada	671_001_air_data.ada
s671100.ada	671_100_air_temp.ada
s671200.ada	671_200_pressure_ratio.ada
s671300.ada	671_300_mach.ada
s671400.ada	671_400_dynamic_pressure.ada
s671500.ada	671_500_speed_of_sound.ada
s671600.ada	671_600_baro_altitude.ada
Fuel_Control_Parts (P672)	
s672000.ada	672_000_fuel_.ada
s672001.ada	672_001_fuel.ada

The following table provides a file name cross reference for all files containing source code for the CAMP mathematical parts:

Coded Name	Development Name
Coordinate_Vector_Matrix_Algebra (P681)	
s681000.ada	681_000_c_algebra_.ada
s681001.ada	681_001_c_algebra.ada
s681100.ada	681_100_vector_opns.ada
s681130.ada	681_130_vector_length.ada
s681140.ada	681_140_dot_product.ada
s681150.ada	681_150_sparse_rt_z_add.ada
s681160.ada	681_160_sparse_rt_x_add.ada
s681170.ada	681_170_sparse_rt_xy_sub.ada
s681180.ada	681_180_set_to_zero_vector.ada
s681200.ada	681_200_matrix_opns.ada
s681230.ada	681_230_set_to_identity_matrix.ada
s681240.ada	681_240_set_to_zero_matrix.ada
s681300.ada	681_300_vector_scalar_opns.ada
s681320.ada	681_320_sparse_x_vector_scalar_mult.ada
s681400.ada	681_400_matrix_scalar_opns.ada
s681500.ada	681_500_cross_product.ada
s681600.ada	681_600_matrix_vector_mult.ada

Coded Name	Development Name
s681700.ada	681_700_matrix_matrix_mult.ada
General_Vector_Matrix_Algebra (P682)	
s682000.ada	682_000_general_algebra_.ada
s682001.ada	682_001_general_algebra.ada
s682100.ada	682_100_vector_opns_uc.ada
s682200.ada	682_200_matrix_opns_uc.ada
s682300.ada	682_300_dyn_sparse_matrix_uc.ada
s682400.ada	682_400_symm_half_storage_matrix.ada
s682500.ada	682_500_symm_full_storage_matrix_uc.ada
s682600.ada	682_600_diagonal_matrix.ada
s682700.ada	682_700_vector_scalar_opns_uc.ada
s682800.ada	682_800_matrix_scalar_opns_uc.ada
s682900.ada	682_900_diag_matrix_scalar_opns.ada
s682a00.ada	682_a00_matrix_matrix_mult_ur.ada
s682b00.ada	682_b00_matrix_vector_mult_ur.ada
s682c00.ada	682_c00_vector_vector_trans_mult_ur.ada
s682d00.ada	682_d00_matrix_matrix_trans_mult_ur.ada
s682e00.ada	682_e00_dot_product_opn_ur.ada
s682f00.ada	682_f00_diag_full_matrix_add_ur.ada
s682g00.ada	682_g00_vector_opns_c.ada
s682h00.ada	682_h00_matrix_opns_c.ada
s682j00.ada	682_j00_dyn_sparse_matrix_c.ada
s682k00.ada	682_k00_symm_full_storage_matrix_c.ada
s682l00.ada	682_l00_vector_scalar_opns_c.ada
s682m00.ada	682_m00_matrix_scalar_opns_c.ada
s682n00.ada	682_n00_matrix_matrix_mult_r.ada
s682p00.ada	682_p00_matrix_vector_mult_r.ada
s682q00.ada	682_q00_vector_vector_trans_mult_r.ada
s682r00.ada	682_r00_matrix_matrix_trans_mult_r.ada
s682s00.ada	682_s00_dot_product_opn_r.ada
s682t00.ada	682_t00_diag_full_matrix_add_r.ada
s682u00.ada	682_u00_vector_matrix_mult_ur.ada
s682v00.ada	682_v00_vector_matrix_mult_r.ada
s682w00.ada	682_w00_aba_trans_dsp_matrix_sq_matrix.ada

Coded Name	Development Name
s682x00.ada	682_x00_aba_trans_vector_sq_matrix.ada
s682y00.ada	682_y00_aba_trans_vector_scalar.ada
s682z00.ada	682_z00_col_matrix_opns.ada
Standard_Trig (P683)	
s683000.ada	683_000_standard_trig_.ada
s683001.ada	683_001_stdtrig_sysfns.ada
Geometric_Operations (P684)	
s684000.ada	684_000_geometric_.ada
s684001.ada	684_001_geometric.ada
s684100.ada	684_100_unit_radial_vector.ada
s684200.ada	684_200_unit_nl_vector.ada
s684300.ada	684_300_seg_unit_nl_vector.ada
s684400.ada	684_400_great_circle_arc_length.ada
s684500.ada	684_500_seg_unit_nl_vector_arcsin.ada
Signal_Processing (P686)	
s686000.ada	686_000_signal_.ada
s686001.ada	686_001_signal.ada
s686100.ada	686_100_ul_limiter.ada
s686200.ada	686_200_u_limiter.ada
s686300.ada	686_300_l_limiter.ada
s686400.ada	686_400_abs_limiter.ada
s686500.ada	686_500_abs_limiter_w_flag.ada
s686600.ada	686_600_first_order_filter.ada
s686700.ada	686_700_tustin_lag_filter.ada
s686800.ada	686_800_tustin_lead_lag_filter.ada
s686900.ada	686_900_second_order_filter.ada
s686a00.ada	686_a00_tustin_integrator_w_limit.ada
s686b00.ada	686_b00_tustin_int_w_asym_limit.ada
General_Purpose_Math (P687)	
s687000.ada	687_000_gp_math_.ada
s687001.ada	687_001_gp_math.ada
s687100.ada	687_100_lookup_even.ada
s687200.ada	687_200_lookup_uneven.ada
s687300.ada	687_300_incrementor.ada

Coded Name	Development Name
s687400.ada	687_400_decrementor.ada
s687500.ada	687_500_run_avg.ada
s687600.ada	687_600_accum.ada
s687700.ada	687_700_change_accum.ada
s687800.ada	687_800_change_calc.ada
s687900.ada	687_900_integrator.ada
s687a00.ada	687_a00_interpolate.ada
s687b00.ada	687_b00_extrapolate.ada
s687c00.ada	687_c00_sqrt.ada
s687d00.ada	687_d00_rsos.ada
s687e00.ada	687_e00_sign.ada
s687f00.ada	687_f00_mean_val.ada
s687g00.ada	687_g00_mad.ada
s687h00.ada	687_h00_lookup_twoway.ada
Polynomials (P688)	
s688000.ada	688_000_polynomials_.ada
s688001.ada	688_001_polynomials.ada
s688200.ada	688_200_chebyshev.ada
s688210.ada	688_210_radian_operations.ada
s688220.ada	688_220_degree_operations.ada
s688230.ada	688_230_semicircle_operations.ada
s688300.ada	688_300_fike.ada
s688310.ada	688_310_semicircle_operations.ada
s688400.ada	688_400_hart.ada
s688410.ada	688_410_radian_operations.ada
s688420.ada	688_420_degree_operations.ada
s688500.ada	688_500_hastings.ada
s688510.ada	688_510_radian_operations.ada
s688520.ada	688_520_degree_operations.ada
s688800.ada	688_800_mod_newton_raphson.ada
s688900.ada	688_900_newton_raphson.ada
s688a00.ada	688_a00_taylor_series.ada
s688a10.ada	688_a10_radian_operations.ada
s688a20.ada	688_a20_degree_operations.ada

Coded Name	Development Name
s688a40.ada	688_a40_natural_log.ada
s688a50.ada	688_a50_base_log.ada
s688b00.ada	688_b00_genl_polynomial.ada
s688c00.ada	688_c00_system_functions.ada
s688c10.ada	688_c10_radian_opns.ada
s688c20.ada	688_c20_semicircle_opns.ada
s688c30.ada	688_c30_degree_opns.ada
s688c40.ada	688_c40_square_root.ada
s688c50.ada	688_c50_base_10.ada
s688c60.ada	688_c60_base_n.ada
s688d00.ada	688_d00_continued_fractions.ada
s688d10.ada	688_d10_radian_operations.ada
s688e00.ada	688_e00_cody_waite.ada
s688e40.ada	688_e40_natural_log.ada
s688e50.ada	688_e50_base_n.ada
s688f00.ada	688_f00_reduction.ada
s688sys.ada	688_sysfns_report.ada
s688sys.ada	688_sysfns_report_.ada
Unit_Conversions (P851)	
s851000.ada	851_000_unit_conversion_.ada
s851001.ada	851_001_unit_conversion.ada
External_Form_Conversion_Twos_Complement (P852)	
s852000.ada	852_000_ext_form_conv_.ada
s852001.ada	852_001_ext_form_conv.ada
Quaternion_Operations (P890)	
s890000.ada	890_000_quaternion_.ada
s890001.ada	890_001_quaternion.ada
s890100.ada	890_100_euler.ada
s890200.ada	890_200_normalized.ada

The following table provides a file name cross reference for all files containing source code for the CAMP abstract mechanism parts:

Coded Name	Development Name
Abstract_Data_Structures (P691)	
s691000.ada	691_000_abstract_data_structures_.ada
s691001.ada	691_001_abstract_data_structures.ada
s691010.ada	691_010_avail_space_opns.ada
s691100.ada	691_100_bounded_fifo.ada
s691200.ada	691_200_unbounded_fifo.ada
s691300.ada	691_300_nonblocking_circular.ada
s691400.ada	691_400_unbounded_priority.ada
s691500.ada	691_500_bounded_stack.ada
s691600.ada	691_600_unbounded_stack.ada

The following table provides a file name cross reference for all files containing source code for the CAMP general utility parts:

Coded Name	Development Name
General_Utilities (P361)	
s361000.ada	361_000_general_util_.ada
s361001.ada	361_001_general_util.ada
Communication_Parts (P602)	
s602000.ada	602_000_communication_.ada
s602001.ada	602_001_communication.ada

III.2 CAMP Parts Test Code

The following table provides a file name cross reference for all files containing CAMP parts test code for the data constant parts:

Coded Name	Development Name
WGS72_Ellipsoid_Metric_Data (P611)	
t611000.ada	611_000_wgs72_metric_tdrvr.ada
WGS72_Ellipsoid_Engineering_Data (P612)	
t612000.ada	612_000_wgs72_engineering_tdrvr.ada
WGS72_Ellipsoid_Unitless_Data (P613)	
t613000.ada	613_000_wgs72_unitless_tdrvr.ada
Conversion_Factors (P614)	
t614000.ada	614_000_conv_factors_tdrvr.ada
Universal_Constants (P615)	
t615000.ada	615_000_univ_const_tdrvr.ada

The following table provides a file name cross reference for all files containing CAMP parts test code for the data types parts:

Coded Name	Development Name
Basic_Data_Types (P621)	
t621000.ada	621_000_bdt_tdrvr.ada
Kalman_Filter_Data_Types (P622)	
t622000.ada	622_000_kdt_tc_.ada
Autopilot_Data_Types (P623)	
t623000.ada	623_000_autopilot_dt_tdrvr.ada

The following table provides a file name cross reference for all files containing CAMP parts test code for the equipment interface parts:

Coded Name	Development Name
Clock_Handler (P634)	
t634000.ada	634_000_clock_tc_.ada
t634zzz.ada	634_zzz_clock_driver_tc.ada

The following table provides a file name cross reference for all files containing CAMP parts test code for the navigation parts:

Coded Name	Development Name
Common_Navigation_parts (P001)	
t001000.ada	001_000_cnav_main_tdrvr.ada
t001x10.ada	001_x10_cnav_comp_test1.ada
t001x20.ada	001_x20_cnav_comp_test2.ada
t001x30.ada	001_x30_alt_int_tdrvr.ada
t001x40.ada	001_x40_comp_grav_accel_lat_in_tdrvr.ada
t001x50.ada	001_x50_comp_grav_accel_sin_lat_tdrvr.ada
t001x60.ada	001_x60_comp_ground_vel_tdrvr.ada
t001x70.ada	001_x70_comp_heading_tdrvr.ada
t001x80.ada	001_x80_comp_rot_incr_tdrvr.ada
t001x90.ada	001_x90_comp_rot_incr_tdrvr.ada
t001xa0.ada	001_xa0_comp_scal_vel_tdrvr.ada
t001xb0.ada	001_xb0_upd_vel_tdrvr.ada
t001xc0.ada	001_xc0_test_tdrvr.ada
Wander_Azimuth_Navigation_Parts (P002)	
t002000.ada	002_000_wa_nav_tc_.ada
t002001.ada	002_001_wa_nav_tc.ada
t002100.ada	002_100_instantiation_tc.ada
t002200.ada	002_200_cca_tc.ada
t002300.ada	002_300_ccaftr_tc.ada
t002400.ada	002_400_cerhv_tc.ada
t002500.ada	002_500_cernrr_tc.ada
t002600.ada	002_600_err_tc.ada
t002700.ada	002_700_cev_tc.ada
t002800.ada	002_800_cl_tc.ada
t002900.ada	002_900_clua_tc.ada
t002a00.ada	002_a00_clong_tc.ada
t002b00.ada	002_b00_cnv_tc.ada
t002c00.ada	002_c00_roc_tc.ada
t002d00.ada	002_d00_ctav_tc.ada
t002e00.ada	002_e00_ctprr_tc.ada
t002f00.ada	002_f00_cwaa_tc.ada
t002g00.ada	002_g00_earth_rel_hor_vel_sin_cos_tc.ada

Coded Name	Development Name
t002h00.ada	002_h00_east_vel_sin_cos_tc.ada
t002i00.ada	002_i00_latitude_w_arctan2_tc.ada
t002j00.ada	002_j00_longitude_w_arctan2_tc.ada
t002k00.ada	002_k00_north_vel_sin_cos_tc.ada
t002l00.ada	002_l00_wander_angle_arctan2_tc.ada
t002m00.ada	002_m00_earth_rel_hor_vel_sin_cos_tc.ada
t002zzz.ada	002_zzz_wa_nav_tdrvr_tc.ada
North_Pointing_Navigation_Parts (P003)	
t003000.ada	003_000_npnav_tc_.ada
t003001.ada	003_001_npnav_tc.ada
t003100.ada	003_100_inst_tc.ada
t003200.ada	003_200_cca_tc.ada
t003300.ada	003_300_roc_tc.ada
t003400.ada	003_400_ernrr_tc.ada
t003500.ada	003_500_err_tc.ada
t003600.ada	003_600_tprr_tc.ada
t003700.ada	003_700_lat_tc.ada
t003800.ada	003_800_long_tc.ada
t003zzz.ada	003_zzz_np_nav_tdrvr_tc.ada

The following table provides a file name cross reference for all files containing CAMP parts test code for the Kalman filter parts:

Coded Name	Development Name
Kalman_Filter_Common_Parts (P651)	
t651000.ada	651_000_kalman_common_tc_.ada
Kalman_Filter_Compact_H_Parts (P652)	
t652000.ada	652_000_kalman_compact_tc_.ada
t652zzz.ada	652_zzz_kalman_compact_tdrvr.ada
Kalman_Filter_Complicated_H_Parts (P653)	
t653000.ada	653_000_kalman_complicated_tc_.ada
t653zzz.ada	653_zzz_kalman_complicated_tdrvr.ada

The following table provides a file name cross reference for all files containing CAMP parts test code for the guidance and control parts:

Coded Name	Development Name
Waypoint_Steering (P661)	
t661000.ada	661_000_wps_tc_.ada
t661001.ada	661_001_wps_tc.ada
t661100.ada	661_100_instantiation_tc.ada
t661200.ada	661_200_svo_tc.ada
t661300.ada	661_300_ctaad_tc.ada
t661400.ada	661_400_caheo_tc.ada
t661500.ada	661_500_dtcw_tc.ada
t661600.ada	661_600_ctand_tc.ada
t661700.ada	661_700_tto_tc.ada
t661800.ada	661_800_svo_asin_tc.ada
t661900.ada	661_900_dtcw_asin_tc.ada
t661zzz.ada	661_zzz_wps_tdrvr.ada
Autopilot (P662)	
t662000.ada	662_000_autopilot_tc_.ada
t662100.ada	662_100_ipp_tc.ada
t662200.ada	662_200_instantiation_tc.ada
t662300.ada	662_300_pitch_autopilot_tc.ada
t662400.ada	662_400_lat_dir_tc.ada
t662zzz.ada	662_zzz_autopilot_tdrvr_tc.ada

The following table provides a file name cross reference for all files containing CAMP parts test code for the nonguidance control parts:

Coded Name	Development Name
Air_Data_Parts (P671)	
t671000.ada	671_000_air_data_tc.ada
t671zzz.ada	671_zzz_air_data_tdrvr_tc.ada
Fuel_Control_Parts (P672)	
t672000.ada	672_000_fuel_tc_.ada
t672100.ada	672_100_instantiation_tc.ada
t672200.ada	672_200_throttle_tc.ada
t672zzz.ada	672_zzz_fuel_tdrvr_tc.ada

The following table provides a file name cross reference for all files containing CAMP parts test code for the mathematical parts:

Coded Name	Development Name
Coordinate_Vector_Matrix_Algebra (P681)	
t681x00.ada	681_x00_cvma_test.ada
General_Vector_Matrix_Algebra (P682)	
t682000.ada	682_000_gvma_tc_.ada
t682001.ada	682_001_gvma_tc.ada
t682100.ada	682_100_vo_unconstrained_tc.ada
t682200.ada	682_200_vo_constrained_tc.ada
t682300.ada	682_300_mo_unconstrained_tc.ada
t682400.ada	682_400_mo_constrained_tc.ada
t682500.ada	682_500_dsmo_unconstrained_tc.ada
t682600.ada	682_600_dsmo_constrained_tc.ada
t682700.ada	682_700_shmo_tc.ada
t682800.ada	682_800_sfmo_unconstrained_tc.ada
t682900.ada	682_900_sfmo_constrained_tc.ada
t682a00.ada	682_a00_dmo_tc.ada
t682b00.ada	682_b00_vso_unconstrained_tc.ada
t682c00.ada	682_c00_vso_constrained_tc.ada
t682d00.ada	682_d00_mso_unconstrained_tc.ada
t682e00.ada	682_e00_mso_constrained_tc.ada
t682f00.ada	682_f00_dmso_tc.ada
t682g00.ada	682_g00_mvm_unrestricted_tc.ada
t682h00.ada	682_h00_mvm_restricted_tc.ada
t682i00.ada	682_i00_vvtm_unrestricted_tc.ada
t682j00.ada	682_j00_vvtm_restricted_tc.ada
t682k00.ada	682_k00_mmm_unrestricted_tc.ada
t682l00.ada	682_l00_mmm_restricted_tc.ada
t682m00.ada	682_m00_mmtm_unrestricted_tc.ada
t682n00.ada	682_n00_mmtm_restricted_tc.ada
t682o00.ada	682_o00_dpo_unrestricted_tc.ada
t682p00.ada	682_p00_dpo_restricted_tc.ada
t682q00.ada	682_q00_dfma_unrestricted_tc.ada
t682r00.ada	682_r00_dfma_restricted_tc.ada
t682s00.ada	682_s00_vmm_unrestricted_tc.ada

Coded Name	Development Name
t682t00.ada	682_t00_vmm_restricted_tc.ada
t682u00.ada	682_u00_aba_tranpose_tc.ada
t682v00.ada	682_v00_col_matrix_tc.ada
t682zzz.ada	682_zzz_gvma_tdrvr.ada
Standard_Trig (P683)	
t683000.ada	683_000_atan2_tc.ada
t683x00.ada	683_x00_report_.ada
t683x01.ada	683_x01_report.ada
t683x10.ada	683_x10_trig_deg_op_functions_test.ada
t683x30.ada	683_x30_trig_inst_test.ada
t683x40.ada	683_x40_trig_rad_op_functions_test.ada
t683x50.ada	683_x50_trig_rad_op_inst_test.ada
t683x60.ada	683_x60_trig_semi_op_functions_test.ada
t683x70.ada	683_x70_trig_semi_op_inst_test.ada
t683zzz.ada	683_zzz_tdrvr.ada
Geometric_Operations (P684)	
t684000.ada	684_000_geo_tc_.ada
t684001.ada	684_001_geo_tc.ada
t684100.ada	684_100_instantiation_tc.ada
t684200.ada	684_200_urv_tc.ada
t684300.ada	684_300_unv_tc.ada
t684400.ada	684_400_csaunv_tc.ada
t684500.ada	684_500_gcal_tc.ada
t684600.ada	684_600_csaunl_asin_tc.ada
t684zzz.ada	684_zzz_geo_tdrvr.ada
Signal_Processing (P686)	
t686000.ada	686_000_signal_processing_tc_.ada
t686100.ada	686_100_ul_limiter_tc.ada
t686200.ada	686_200_u_limiter_tc.ada
t686300.ada	686_300_l_limiter_tc.ada
t686400.ada	686_400_abs_limiter_tc.ada
t686500.ada	686_500_abs_limiter_w_flag_tc.ada
t686600.ada	686_600_first_order_filter_tc.ada
t686700.ada	686_700_tustin_lag_filter_tc.ada

Coded Name	Development Name
t686800.ada	686_800_tustin_lead_lag_filter_tc.ada
t686900.ada	686_900_second_order_filter_tc.ada
t686a00.ada	686_a00_tustin_integrator_w_flag_tc.ada
t686b00.ada	686_b00_tustin_integrator_asymmetric_tc.ada
t686zzz.ada	686_zzz_signal_processing_tdrvr_tc.ada
General_Purpose_Math (P687)	
t687000.ada	687_000_gpmath_tc_.ada
t687100.ada	687_100_lookup_even_tc.ada
t687200.ada	687_200_lookup_uneven_tc.ada
t687300.ada	687_300_incrementor_tc.ada
t687400.ada	687_400_decrementor_tc.ada
t687500.ada	687_500_runavg_tc.ada
t687600.ada	687_600_accumulator_tc.ada
t687700.ada	687_700_chgcalc_tc.ada
t687800.ada	687_800_chgaccum_tc.ada,
t687900.ada	687_900_integrator_tc.ada
t687a00.ada	687_a00_interpolate_tc.ada
t687c00.ada	687_c00_sqrt_tc.ada
t687d00.ada	687_d00_rsos_tc.ada
t687e00.ada	687_e00_sign_tc.ada
t687f00.ada	687_f00_meanval_tc.ada
t687g00.ada	687_g00_meanabsdiff_tc.ada
t687h00.ada	687_h00_two_way_lookup_tc.ada
t687zzz.ada	687_zzz_gpmath_tdrvr.ada
Polynomials (P688)	
t688000.ada	688_000_polynomials_ut_.ada
t688001.ada	688_001_polynomials_ut.ada
t688100.ada	688_100_instantiation_ut.ada
t688200.ada	688_200_like_ut.ada
t688300.ada	688_300_genl_poly_ut.ada
t688400.ada	688_400_mod_newton_raphson_ut.ada
t688500.ada	688_500_newton_raphson_ut.ada
t688600.ada	688_600_chebyshev_ut.ada
t688700.ada	688_700_continued_fractions_ut.ada

Coded Name	Development Name
t688800.ada	688_800_hart_ut.ada
t688900.ada	688_900_hastings_ut.ada
t688910.ada	688_910_radopns_ut.ada
t688920.ada	688_920_degopns_ut.ada
t688a00.ada	688_a00_taylor_ut.ada
t688a10.ada	688_a10_radopns_ut.ada
t688a20.ada	688_a20_degopns_ut.ada
t688a30.ada	688_a30_natlog_ut.ada
t688a40.ada	688_a40_logn_ut.ada
t688b00.ada	688_b00_cody_waite_ut.ada
t688b10.ada	688_b10_natlog_ut.ada
t688b20.ada	688_b20_logn_ut.ada
t688c00.ada	688_c00_reduction_op_ut.ada
t688x10.ada	688_x10_sysfns_poly_degop_excep_tc.ada
t688x20.ada	688_x20_sysfns_poly_deg_op_fns_tc.ada
t688x30.ada	688_x30_sysfns_poly_deg_op_inst_tc.ada
t688x40.ada	688_x40_sysfns_poly_log10opexcep_tc.ada
t688x50.ada	688_x50_sysfns_poly_log10op_fns_tc.ada
t688x60.ada	688_x60_sysfns_poly_log10op_inst_tc.ada
t688x70.ada	688_x70_sysfns_poly_lognop_excep_tc.ada
t688x80.ada	688_x80_sysfns_poly_logn_op_fnns_tc.ada
t688x90.ada	688_x90_sysfns_poly_logn_op_inst_tc.ada
t688xa0.ada	688_xa0_sysfns_poly_radop_excep_tc.ada
t688xb0.ada	688_xb0_sysfns_poly_rad_op_fns_tc.ada
t688xc0.ada	688_xc0_sysfns_poly_rad_op_inst_tc.ada
t688xe0.ada	688_xe0_sysfns_poly_semiop_excep_tc.ada
t688xf0.ada	688_xf0_sysfns_poly_semiop_fns_tc.ada
t688xg0.ada	688_xg0_sysfns_poly_semi_op_inst_tc.ada
t688xh0.ada	688_xh0_sysfns_poly_sqrtop_excep_tc.ada
t688xi0.ada	688_xi0_sysfns_poly_sqrt_op_fns_tc.ada
t688xj0.ada	688_xj0_sysfns_poly_sqrt_op_inst_tc.ada
t688xk0.ada	688_xk0_sysfns_report.ada
t688xl0.ada	688_xl0_sysfns_report_.ada
t688zzz.ada	688_zzz_polynomials_tdrvr_ut.ada

Coded Name	Development Name
Unit_Conversions (P851)	
t851000.ada	851_000_uconversion_tc_.ada
t851100.ada	851_100_instantiate_tc.ada
t851200.ada	851_200_length_tc.ada
t851300.ada	851_300_gravity_tc.ada
t851400.ada	851_400_angles_vel_tc.ada
t851500.ada	851_500_time_tc.ada
t851600.ada	851_600_temperature_tc.ada
t851700.ada	851_700_weight_tc.ada
t851zzz.ada	851_zzz_testdr_tc.ada
External_Form_Conversion_Twos_Complement (P852)	
t852000.ada	852_000_ext_form_conv_tc_.ada
t852100.ada	852_100_instantiation_tc.ada
t852200.ada	852_200_scale_tc.ada
t852300.ada	852_300_unscale_tc.ada
t852zzz.ada	852_zzz_testdr_tc.ada
Quaternion_Operations (P890)	
t890000.ada	890_000_quat_opns_tc_.ada
t890zzz.ada	890_zzz_quat_tdrvr.ada

The following table provides a file name cross reference for all files containing CAMP parts test code for the abstract mechanism parts:

Coded Name	Development Name
Abstract_Data_Structures (P691)	
t691000.ada	691_000_ads_tc.ada
t691100.ada	691_100_instantiation_tc.ada
t691200.ada	691_200_b_fifo_tc.ada
t691300.ada	691_300_ub_fifo_tc.ada
t691400.ada	691_400_nbcirc_buffer_tc.ada
t691500.ada	691_500_priority_queue_tc.ada
t691600.ada	691_600_b_stack_tc.ada
t691700.ada	691_700_ub_stack_tc.ada
t691zzz.ada	691_zzz_run_tests_tc.ada

The following table provides a file name cross reference for all files containing CAMP parts test code for the general utility parts:

Coded Name	Development Name
General_Utilities (P361)	
t361000.ada	361_000_general_tc_.ada
t361100.ada	361_100_instantiation_tc.ada
t361200.ada	361_200_instr_set_tc.ada
t361zzz.ada	361_zzz_general_tc.ada
Communication_Parts (P602)	
t602000.ada	602_000_comm_tc_.ada
t602100.ada	602_100_instantiation_tc.ada
t602200.ada	602_200_update_tc.ada
t602zzz.ada	602_zzz_comm_tc.ada

III.3 Test Utilities Code

The following table provides a file name cross reference for all files containing source code for the test utilities:

Coded Name	Development Name
ubg000.ada	basic_get.ada
udt000.ada	date_time.ada
uro000.ada	ro_000_retrieval_opns_.ada
uro001.ada	ro_001_retrieval_opns.ada
uro100.ada	ro_100_retrievals.ada
urr000.ada	rr_000_record_results_.ada
urr001.ada	rr_001_record_results.ada
urr010.ada	rr_010_make_a_header.ada
urr020.ada	rr_020_header_check.ada
urr030.ada	rr_030_basic_recorder_basis.ada
urr040.ada	rr_040_record_this_bases.ada
urr100.ada	rr_100_initialize.ada
urr200.ada	rr_200_subtitle.ada
urr300.ada	rr_300_change_input_file.ada
urr400.ada	rr_400_retrieval_opns.ada
urr500.ada	rr_500_blank_line_next_page.ada
urr600.ada	rr_600_noting_routines.ada
urr700.ada	rr_700_close_file.ada
urr800.ada	rr_800_float_recording_opns.ada

Coded Name	Development Name
urr900.ada	rr_900_enum_recording_opns.ada
urra00.ada	rr_a00_integer_recording_opns.ada

III.4 Test Data Files

The following table provides a file name cross reference for all files containing input/output data used by the CAMP parts test code when testing the data types packages:

Coded Name	Development Name
Basic_Data_Types (P621)	
d621bdt.bmk	621_bdt.bmk
Kalman_Filter_Data_Types (P622)	
d622kdt.inp	622_kdt.inp
d622kdt.bmk	622_kdt.bmk

The following table provides a file name cross reference for all files containing input/output data used by the CAMP parts test code when testing the equipment interface packages:

Coded Name	Development Name
Clock_Handler (P634)	
d634clo.inp	634_clock.inp
d634clo.bmk	634_clock.bmk

The following table provides a file name cross reference for all files containing input/output data used by the CAMP parts test code when testing the navigation packages:

Coded Name	Development Name
Common_Navigation_parts (P001)	
d001cna.bmk	001_cnav.bmk
d001cna.inp	001_cnav.inp
Wander_Azimuth_Navigation_Parts (P002)	
d002wan.inp	002_wa_nav_input.bmk
d002wan.bmk	002_wa_nav_output.bmk
North_Pointing_Navigation_Parts (P003)	
d003npn.inp	003_npnav_input.bmk
d003npn.bmk	003_npnav_output.bmk
Direction_Cosine_Matrix_Operations (P644)	
d644dcm.bmk	644_dcm_opns.bmk

Coded Name	Development Name
d644dcm.inp	644_dcm_opns.inp

The following table provides a file name cross reference for all files containing input/output data used by the CAMP parts test code when testing the Kalman filter packages:

Coded Name	Development Name
Kalman_Filter_Common_Parts (P651)	
d651kal.bmk	651_kalman_common.bmk
d651kal.inp	651_kalman_common.inp
Kalman_Filter_Compact_H_Parts (P652)	
d652kal.bmk	652_kalman_compact.bmk
d652kal.inp	652_kalman_compact.inp
Kalman_Filter_Complicated_H_Parts (P653)	
d653kal.bmk	653_kalman_complicated.bmk
d653kal.inp	653_kalman_complicated.inp

The following table provides a file name cross reference for all files containing input/output data used by the CAMP parts test code when testing the guidance and control packages:

Coded Name	Development Name
Waypoint_Steering (P661)	
d661wps.inp	661_wps_input.bmk
d661wps.bmk	661_wps_output.bmk
Autopilot (P662)	
d662aut.bmk	662_auto.bmk
d662aut.inp	662_auto.inp

The following table provides a file name cross reference for all files containing input/output data used by the CAMP parts test code when testing the nonguidance control packages:

Coded Name	Development Name
Air_Data_Parts (P671)	
d671air.bmk	671_air_data.bmk
d671air.inp	671_air_data.inp
Fuel_Control_Parts (P672)	
d672fue.bmk	672_fuel.bmk
d672fue.inp	672_fuel.inp

The following table provides a file name cross reference for all files containing input/output data used by the CAMP parts test code when testing the mathematical packages:

Coded Name	Development Name
Coordinate_Vector_Matrix_Algebra (P681)	
d681001.bmk	681_cross_product.bmk
d681002.bmk	681_cross_product_instantiation.bmk
d681003.bmk	681_matrix_matrix_multiply.bmk
d681004.bmk	681_matrix_matrix_multiply_inst.bmk
d681005.bmk	681_matrix_vector_multiply.bmk
d681006.bmk	681_matrix_vector_multiply_inst.bmk
d681007.bmk	681_mo_inst.bmk
d681008.bmk	681_mo_matrix_scalar_minus.bmk
d681009.bmk	681_mo_matrix_scalar_plus.bmk
d681010.bmk	681_mo_minus.bmk
d681011.bmk	681_mo_plus.bmk
d681012.bmk	681_mo_set_to_identity.bmk
d681013.bmk	681_mo_set_to_zero.bmk
d681014.bmk	681_ms_divide.bmk
d681015.bmk	681_ms_inst.bmk
d681016.bmk	681_ms_multiply.bmk
d681017.bmk	681_vo_dot_product.bmk
d681018.bmk	681_vo_inst.bmk
d681019.bmk	681_vo_length.bmk
d681020.bmk	681_vo_minus.bmk
d681021.bmk	681_vo_plus.bmk
d681022.bmk	681_vo_sparse_xy_minus.bmk
d681023.bmk	681_vo_sparse_x_add.bmk

Coded Name	Development Name
d681024.bmk	681_vo_sparse_z_add.bmk
d681025.bmk	681_vs_divide.bmk
d681026.bmk	681_vs_inst.bmk
d681027.bmk	681_vs_multiply.bmk
d681028.bmk	681_vs_sparse_x_multiply.bmk
General_Vector_Matrix_Algebra (P682)	
d682gvm.bmk	682_gvma_output.bmk
Standard_Trig (P683)	
d683ata.bmk	683_atan2.bmk
d683ata.inp	683_atan2.inp
d683deg.ben	683_trig_deg_test.ben
d683ins.ben	683_trig_inst_test.ben
d683rad.ben	683_trig_rad_test.ben
d683sem.ben	683_trig_semi_test.ben
Geometric_Operations (P684)	
d684geo.inp	684_geo_input.inp
d684geo.bmk	684_geo_output.bmk
Signal_Processing (P686)	
d686sig.bmk	686_signal_processing.bmk
General_Purpose_Math (P687)	
d687000.bmk	687_000_gpmath.bmk
Polynomials (P688)	
d688pol.bmk	688_poly_ut.bmk
d688pol.inp	688_poly_ut.inp
d688001.ben	688_sysfns_base_10_log_exception_test.ben
d688002.com	688_sysfns_base_10_log_exception_test.com
d688003.ben	688_sysfns_base_10_log_function_test.ben
d688004.com	688_sysfns_base_10_log_function_test.com
d688005.ben	688_sysfns_base_10_log_inst_test.ben
d688006.ben	688_sysfns_base_n_log_exception_test.ben
d688007.com	688_sysfns_base_n_log_exception_test.com
d688008.ben	688_sysfns_base_n_log_function_test.ben
d688009.com	688_sysfns_base_n_log_function_test.com
d688010.ben	688_sysfns_base_n_log_inst_test.ben

Coded Name	Development Name
d688011.ben	688_sysfns_deg_op_exceptions_test.ben
d688012.com	688_sysfns_deg_op_exceptions_test.com
d688013.ben	688_sysfns_deg_op_functions_test.ben
d688014.com	688_sysfns_deg_op_functions_test.com
d688015.ben	688_sysfns_deg_op_inst_test.ben
d688016.ben	688_sysfns_rad_op_exceptions_test.ben
d688017.com	688_sysfns_rad_op_exceptions_test.com
d688018.ben	688_sysfns_rad_op_functions_test.ben
d688019.com	688_sysfns_rad_op_functions_test.com
d688020.ben	688_sysfns_rad_op_inst_test.ben
d688021.ben	688_sysfns_semic_op_exceptions_test.ben
d688022.com	688_sysfns_semic_op_exceptions_test.com
d688023.ben	688_sysfns_semic_op_functions_test.ben
d688024.com	688_sysfns_semic_op_functions_test.com
d688025.ben	688_sysfns_semic_op_inst_test.ben
d688026.ben	688_sysfns_square_root_exception_test.ben
d688027.com	688_sysfns_square_root_exception_test.com
d688028.ben	688_sysfns_square_root_function_test.ben
d688029.com	688_sysfns_square_root_function_test.com
d688030.ben	688_sysfns_square_root_inst_test.ben
Unit_Conversions (P851)	
d851uc.bmk	851_uc.bmk
External_Form_Conversion_Twos_Complement (P852)	
d852efc.bmk	852_efc.bmk
d852efc.inp	852_efc.inp
Quaternion_Operations (P890)	
d890qua.bmk	890_quat_opns.bmk
d890qua.inp	890_quat_opns.inp

The following table provides a file name cross reference for all files containing input/output data used by the CAMP parts test code when testing the abstract mechanism packages:

Coded Name	Development Name
Abstract_Data_Structures (P691)	
d691ads.bmk	691_ads.bmk

The following table provides a file name cross reference for all files containing input/output data used by the CAMP parts test code when testing the general utility packages:

Coded Name	Development Name
General_Utilities (P361)	
d361gen.bmk	361_general.bmk
Communication_Parts (P602)	
d602com.bmk	602_comm.bmk

IV. NON-UPDATED TEST CODE

The following source code files contain test code which can no longer be compiled due to modifications in the CAMP parts:

1. t003001.ada
2. t003002.ada
3. t003300.ada
4. t003400.ada
5. t003500.ada
6. t003600.ada
7. t003700.ada
8. t003800.ada
9. t003zzz.ada
10. t671000.ada
11. t681x00.ada

V. MICROFICHE INDEX

The following table shows which pages of the CAMP Parts Sizing List, CAMP Parts Catalog Index, and CAMP Parts Catalog are contained on which sheets of microfiche:

Microfiche Title	Microfiche Sheet Number	Page Numbers	Description
CAMP Parts Sizing List	1 of 1	all pages	
CAMP Parts Catalog Index	1 of 1	i	table of contents
		1 thru 10	Part Name Index
		11 thru 19	Part Identification Number Index
CAMP Parts Catalog	1 of 25	i - xii	
		1-1 - 5-8	
	2 of 25	5-9 - 5-106	
	3 of 25	5-107 - 5-204	
	4 of 25	5-205 - 5-302	
	5 of 25	5-303 - 5-400	
	6 of 25	5-401 - 5-498	
	7 of 25	5-499 - 5-596	
	8 of 25	5-597 - 5-694	
	9 of 25	5-695 - 5-792	
	10 of 25	5-793 - 5-890	
	11 of 25	5-891 - 5-988	
	12 of 25	5-989 - 5-1086	
	13 of 25	5-1087 - 5-1184	
	14 of 25	5-1185 - 5-1282	
	15 of 25	5-1283 - 5-1380	
	16 of 25	5-1381 - 5-1478	
	17 of 25	5-1479 - 5-1576	
	18 of 25	5-1577 - 5-1674	
	19 of 25	5-1675 - 5-1772	
	20 of 25	5-1773 - 6-32	
	21 of 25	6-33 - 6-130	
	22 of 25	6-131 - 6-228	
	23 of 25	6-229 - 6-326	
	24 of 25	6-327 - 6-424	
	25 of 25	6-425 - 7-11	

SUPPLEMENTARY

INFORMATION

DEPARTMENT OF THE AIR FORCE
WRIGHT LABORATORY (AFSC)
EGLIN AIR FORCE BASE, FLORIDA, 32542-5434

ERRATA
AD-B120249

REPLY TO ATTN OF: MNOI

13 Feb 92

SUBJECT: Removal of Distribution Statement and Export-Control Warning Notices

TO: Defense Technical Information Center
ATTN: DTIC/HAR (Mr William Bush)
Bldg 5, Cameron Station
Alexandria, VA 22304-6145

1. The following technical reports have been approved for public release by the local Public Affairs Office (copy attached).

	Technical Report Number	AD Number
1.	88-18-Vol-4	ADB 120 251
2.	88-18-Vol-5	ADB 120 252
3.	88-18-Vol-6	ADB 120 253
4.	88-25-Vol-1	ADB 120 309
5.	88-25-Vol-2	ADB 120 310
6.	88-62-Vol-1	ADB 129 568
7.	88-62-Vol-2	ADB 129 569
8.	88-62-Vol-3	ADB 129-570
9.	85-93-Vol-1	ADB 102-654
10.	85-93-Vol-2	ADB 102-655
11.	85-93-Vol-3	ADB 102-656
12.	88-18-Vol-1	ADB 120 248
13.	88-18-Vol-2	ADB 120 249
14.	88-18-Vol-7	ADB 120 254
15.	88-18-Vol-8	ADB 120 255
16.	88-18-Vol-9	ADB 120 256
17.	88-18-Vol-10	ADB 120 257
18.	88-18-Vol-11	ADB 120 258
19.	88-18-Vol-12	ADB 120 259

2. If you have any questions regarding this request call me at DSN 872-4620.

LYNN S. WARGO
Chief, Scientific and Technical
Information Branch

1 Atch
AFDTC/PA Ltr, dtd 30 Jan 92

ERRATA

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE DEVELOPMENT TEST CENTER (AFSC)
EGLIN AIR FORCE BASE, FLORIDA 32542-5000

REPLY TO ATTN OF: PA (Jim Swinson, 882-3931) 30 January 1992

SUBJECT: Clearance for Public Release

TO: WL/MNA

The following technical reports have been reviewed and are approved for public release: AFATL-TR-88-18 (Volumes 1 & 2), AFATL-TR-88-18 (Volumes 4 thru 12), AFATL-TR-88-25 (Volumes 1 & 2), AFATL-TR-88-62 (Volumes 1 thru 3) and AFATL-TR-85-93 (Volumes 1 thru 3).

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AFDTC/PA 92-039